

## DETAILED ACTION

### *An examiner's overview of the present invention*

The present invention aims to prevent possible tearing/breaking feed holes **11** in a perforated continuous paper **1** transported at a predetermined speed by a tractor **21** having feed pins **12** (Fig. 11, reproduced below). A pair of rollers **4**, located downstream of an image forming device **3**, pulls the paper. A vacuum brake **5**, located upstream of the tractor, exerts a braking force on the paper. The braking force is varied (adjusted) based on an imbalance in feeding tensions upstream and downstream of the tractor, as to maintain the feed pins of the tractor within the feed holes, thus prevent the feed holes from being torn. In one embodiment, a feed hole tearing/breaking/deformation detection sensor **41** is provided, and the braking force is varied (adjusted) based on a detection result of said sensor **41**.

That is, if the braking force exerted by the vacuum brake **5** were too small, the pair of roller **4** might pull the paper much faster than the tractor **21** feeds the paper, thus the feed pins **12** of the tractor **21** could tear the feed holes. Conversely, if the braking force were too large, the pair of rollers **4** would not be able to pull the paper at the same speed as the tractor **21**, thus the feed pins **12** of the tractor **21** likewise could tear the feed holes. So, as mentioned, the braking force exerted by the vacuum brake **5** is varied (adjusted) in order to prevent the feed pins from tearing the feed holes.

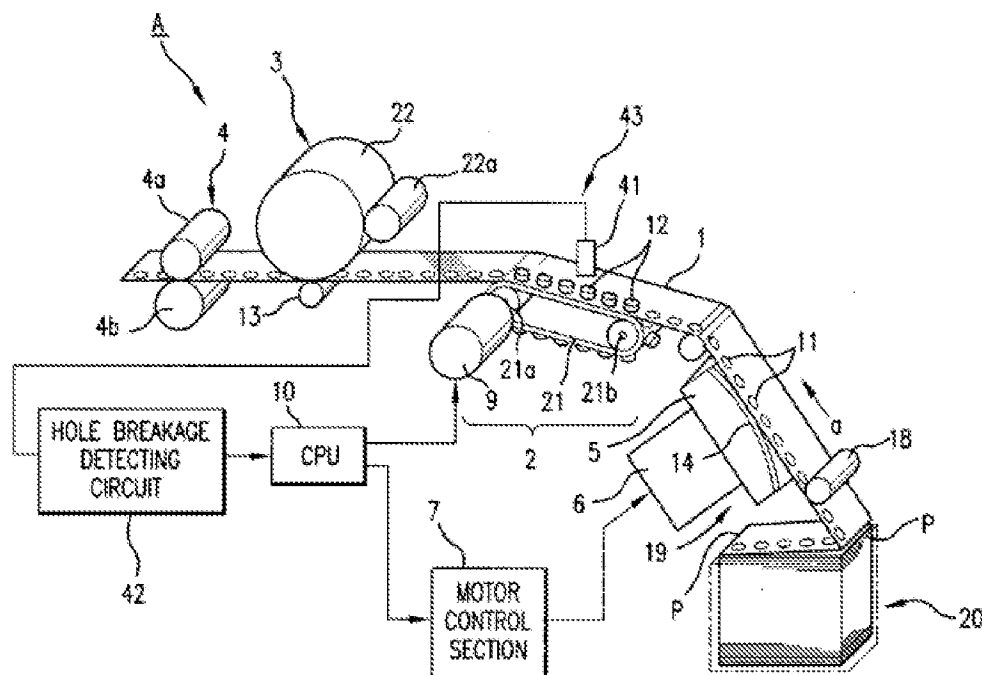


FIG. 11

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1, 4, 8, 11, 15-20 and 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chinzei (JP 07215551 A) in view of Miyakoshi (JP 05053395 A) and Nishimura et al. (US 5,018,888).

Claims 1, 8 and 17-20:

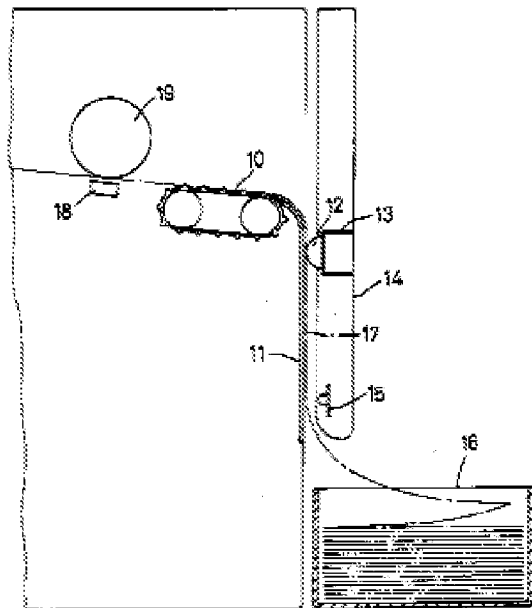
Chinzei teaches a continuous paper feeding apparatus for feeding a perforated continuous paper sheet to an image forming device 18, 19 (See figs. 2-4, 6 and 7, reproduced below), comprising:

**a paper supply device 16** configured to supply the continuous paper sheet;

**a tractor 10** (20, 40 or 50) provided at a location upstream of said image forming device 18, 19 to feed the continuous paper sheet supplied from said paper supply device while engaging perforations of the continuous paper sheet;

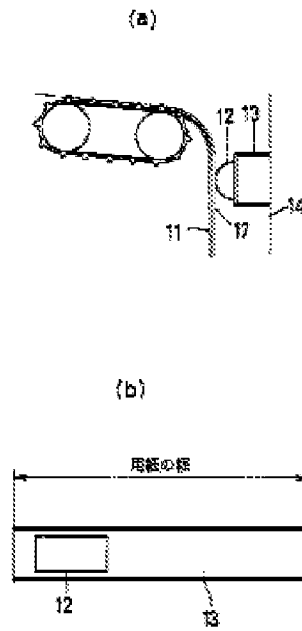
【図2】

第1の実施例に係る連続紙搬送装置の全体構成図。



【図3】

第1の実施例の變形例を説明する図。

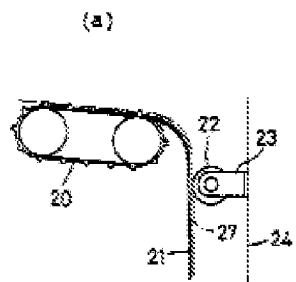


【図7】

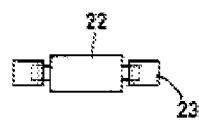
第3の実施例に係る連続紙搬送装置の構成図。

【図4】

第2の実施例に係る連続紙搬送装置の構成図。

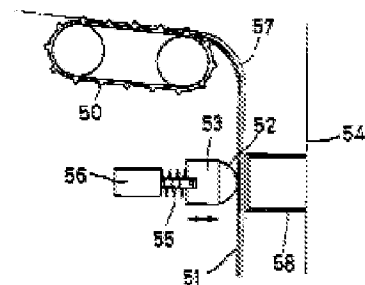
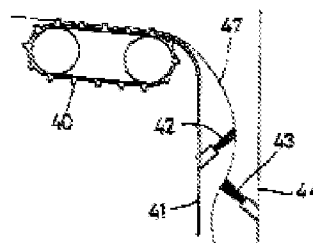


(b)



【図6】

第4の実施例に係る連続紙搬送装置の構成図。



**a braking device** (Fig. 7, 5<sup>th</sup> embodiment, comprising a sheet guide 58, a clamper 52 movable against the sheet guide 58 by an activation device/solenoid 56 and a push spring 55) located between said paper supply device 16 and said tractor 10 and configured to apply a braking force to the continuous paper sheet (Paragraphs [0003] – [0007], summarized as follows: “when the carrying force of the feed roller located in the slipstream [downstream] side of the photoconductive drum 19 is too large compared with that of the feed tractor 10, there is a problem that the perforated holes in the paper will be torn...By giving a paper a back load in an opposite direction to the feed direction, such a problem can be solved...the tearing of the holes will not occur”);

**a braking force setting device** configured to set the braking force (Paragraphs [0015] “By changing the back load [braking force]... a paper skew is controlled [besides preventing the perforated from being torn].” Paragraph [0019] “Regulation which prevents generating of a paper skew [besides preventing the perforated from being torn] can be performed by changing the back load.” Inherently, Chinzei's apparatus must have a braking force setting device configured to regulate/set the back load [braking force]);

**a roller** provided at a location downstream of said image forming device 18, 19 to feed the continuous paper sheet so that a feeding speed of the roller is slightly higher than that of the tractor (Paragraph [0002] “a photoconductive drum 19 being arranged in the slipstream [downstream] side of the tractor feeder 10, and a feeder roller which pulls the paper being further located in the slipstream [downstream] side.” Paragraph [0010] “The paper is pulled and conveyed by the

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feed roller [not illustrated] located in the slipstream side of the photoconductive drum 19.” Understandably, feeding speed of the feed roller must be slightly higher than that of the tractor 10 in order for the paper being pulled and conveyed by said feed roller), and

**a controller** to control the braking force applied by the braking device according to the setting made by said braking force setting device (Chinzei’s apparatus, as discussed above, regulates the back load [braking force] to prevents generating of a paper skew and to prevent the perforated from being torn or the paper from separating from the feed tractor. Inherently, Chinzei’s apparatus must have at least a controller to regulate the back load [braking force]).

Chinzei is silent about the feed roller (not illustrated) comprises a pair of rollers.

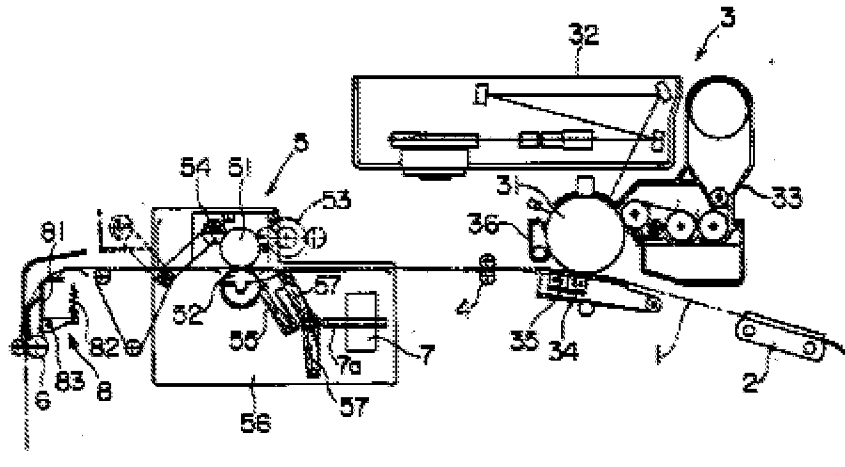
Chinzei doesn’t expressly state that the braking force setting device is configured to variably set the braking force based on an imbalance in feeding tensions upstream and downstream the tractor on the continuous paper sheet.

Miyakoshi likewise teaches a continuous paper feeding apparatus (Fig. 1, reproduced below) for feeding a perforated continuous paper sheet 1 to an image forming device 3. The apparatus includes a pair of rollers 4 which feeds the paper in a pulled state between the tractor 2 and the pair of rollers 4 (Abstract). Understandably, a feeding speed of Miyakoshi’s pair of rollers 4 must also be

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slightly higher than that of the tractor 2 in order to have the paper 1 in the pulled state.

【図1】

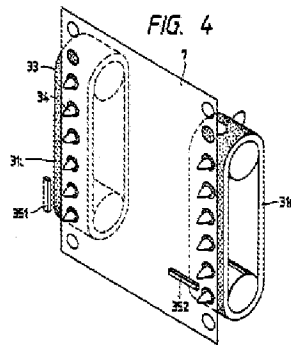


It would have been obvious to one of ordinary skill in the art at the time the present invention was made to have Chinzei's feed roller comprise a pair of rollers, in order to feed the paper, in view of Miyakoshi.

Nishimura, on the other hand, also teaches a continuous paper feeding apparatus for feeding a perforated continuous paper sheet to an image forming device, comprising: **a paper supply** configured to supply the continuous paper sheet; **a tractor 33** (having feed pins 34. See fig. 4, reproduced below) provided at a location upstream of said image forming device to feed the continuous paper sheet supplied from said paper supply device while engaging perforations/holes of the continuous paper sheet; **a braking device** (similar to Chinzei's braking

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device and comprising a sheet guide 19, a clamper 18 movable by a activation device/motor 21 and push springs 201. See fig. 1) located between said paper supply device and said tractor 33 and configured to apply a braking force to the continuous paper sheet; **a braking force setting device 50** (driver for the motor 21) configured to variably set the braking force based on an imbalance in feeding tensions on the continuous paper sheet, in order to prevent possible tearing/deformation of the perforations/holes (Col. 1 lines 16-24; col. 3 line 64- col. 4 line 2; col. 5 lines 6-32).



Besides, as shown in Nishimura's figs. 5 & 6(ii), reproduced below, the feed pins 34 of the tractor 33 could tear/deform the feed holes if the paper were pulled excessively such that the situation would create imbalanced feeding tensions on the paper at the feed pins. That is, the paper would be pulled excessively by the braking device against the feed pins, or vice versa, and might be torn or deformed. Therefore, similar to the present invention (See page 2 of this Office action), Nishimura includes **a detector for detecting an amount of tearing/deformation of the feed holes**...so that the feeding tensions on the paper (effectively, the braking force exerted by the braking device on the paper) can be automatically and properly adjusted by use of the outputs of the detector

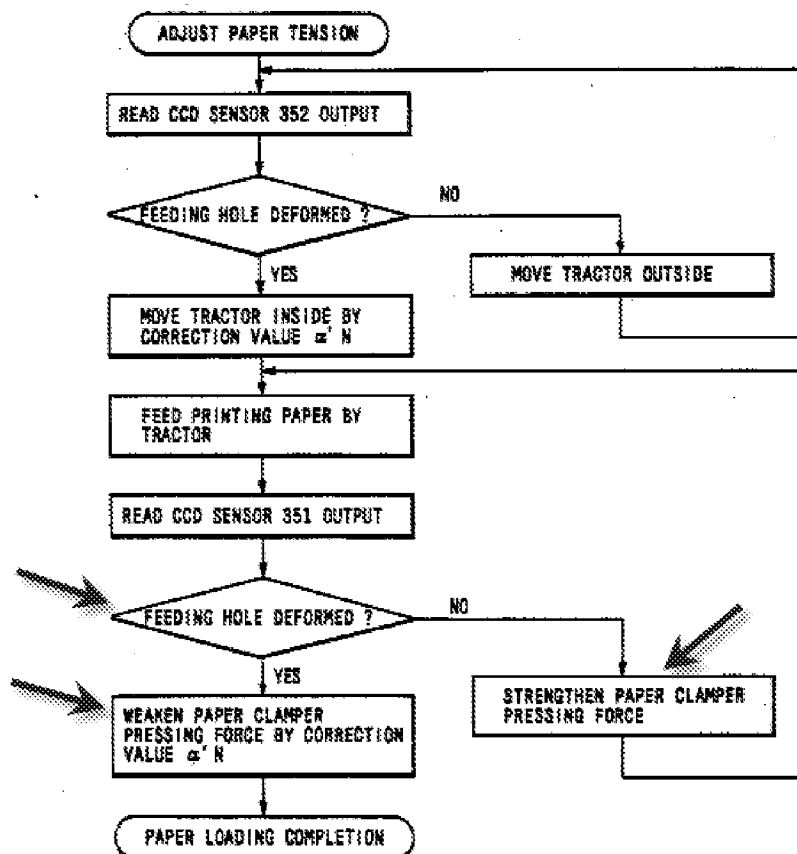
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(Col. 1 lines 50-58). In other words, Nishimura's braking force setting device 50 is configured to variably set the braking force based on an imbalance in feeding tensions on the continuous paper sheet, in order to automatically adjust tension of the paper to a desired value to prevent possible tearing of the feed holes.

FIG. 5

PAPER FEEDING DIRECTION TENSION		PAPER WIDTHWISE DIRECTION TENSION	
RELATIONSHIP IN POSITION BETWEEN FEEDING PIN AND FEEDING HOLE	CCD SENSOR OUTPUT	RELATIONSHIP IN POSITION OF FEEDING PIN AND FEEDING HOLE	CCD SENSOR OUTPUT
a			
b			
c			

FIG. 6(ii)





It would have been obvious to one of ordinary skill in the art at the time the present invention was made to have Chinzei's braking force setting device configured to variably set the braking force based on an imbalance in feeding tensions on the continuous paper sheet, in order to automatically adjust tension of the paper to a desired value to prevent possible tearing of the feed holes, in view of Nishimura. Chinzei's apparatus could also have included a detector for detecting an amount of tearing/deformation of the feed holes, so that the braking force setting device, configured to variably set the braking force on the paper, can automatically and properly set/adjust the braking force by use of the outputs of the detector, in order to prevent tearing/deformation of the feed holes, in view of Nishimura.

Chinzei's braking force setting device, as modified, meets all the structures claimed by the present invention, regardless of its intended use, since the modified braking force setting device ***is capable of and can be used for*** variably setting the braking force based on an imbalance in feeding tensions upstream and downstream the tractor on the continuous paper sheet. (Also note that the detector for detecting an amount of tearing/deformation of the feed holes can detect an imbalance in feeding tensions upstream and downstream the tractor on the continuous paper sheet.)

Claims 4, 11 and 23:

Chinzei as modified teaches a printer according to claims 1, 8 and 17, wherein said braking force setting device sets the braking force according to a

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type of the continuous paper sheet (Nishimura's abstract: "the desired tension is determined from paper thickness [type]").

Claim 15:

Chinzei as modified teaches a printer according to claim 8, further comprising a fixing device 5 (Miyakoshi's fig. 1) configured to fix the image onto the continuous paper sheet at a location downstream of said printing device 3.

Claim 16:

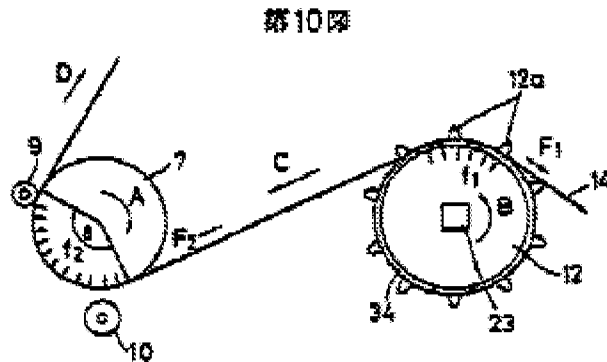
Chinzei as modified teaches a printer according to claim 15, wherein the fixing device 5 (Miyakoshi's fig. 1) applying tension to the continuous paper sheet (Miyakoshi's abstract "the recording paper 1 is carried in a pulled state between the fixing device 5 and the scuff roller 6." Evidently, the fixing device 5 together with the scuff roller 6 applies tension to the recording paper).

**Claims 5, 12 and 24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chinzei in view of Miyakoshi and Nishimura, as applied to claims 1, 8 and 17 above, and further in view of Ara Yoji (JP 61094955 A).

Chinzei in view of Miyakoshi and Nishimura teaches a continuous paper feeding apparatus according to claims 1, 8 and 17.

Chinzei in view of Miyakoshi and Nishimura doesn't teach setting the braking force according to conditions of installation environment.

Ara Yoji teaches a perforated continuous paper feed device equipped with a tractor 12 which automatically adjusts to create a proper braking force  $F_1$  according to conditions of an environment in which the device is installed. As such, the paper is prevented from being fed exceedingly to platen 7 by frictional force  $F_2$ . In other words, high temperature, high humidity, etc., may cause the paper to be fed exceedingly by frictional force  $F_2$ , thus the counter braking force  $F_1$  should be adjusted accordingly to prevent any excessive feeding (See Abstract).



It would have been obvious to one of ordinary skill in the art at the time the present invention was made to have Chinzei's braking force adjusted according to conditions of installation environment, so that the paper is prevented from being fed exceedingly by the frictional force of the pair of feed rollers, in view of Ara Yoji.

**Claims 6, 13, 25, 27 and 28** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chinzei in view of Miyakoshi and Nishimura, as applied to claims 1, 8 and 17 above, and further in view of Wassermann (US 3,259,288).

Claims 6, 13 and 25:

Chinzei in view of Miyakoshi and Nishimura teaches a continuous paper feeding apparatus according to claims 1, 8 and 17.

Chinzei in view of Miyakoshi and Nishimura doesn't teach that the braking device includes an evacuating device to apply a suction force to the printing paper sheet.

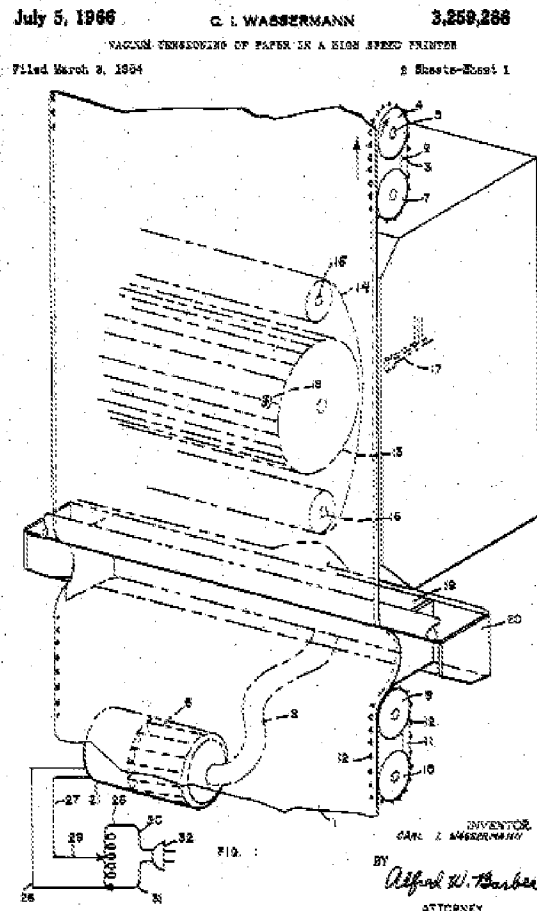
Wassermann teaches an evacuation device 19 disposed in a feeding path of a continuous paper which is fed by a tractor to an image forming device, so that the tensioning of the paper can be easily and accurately controlled, tearing of perforation holes can be prevented, the operation of the printer is greatly simplified, starting and stopping the paper is smoother (Col. 1 lines 42-70).

It would have been obvious to one of ordinary skill in the art at the time the present invention was made to use Wassermann's evacuation device in place of Chinzei + Nishimura's braking device to apply a suction force to the printing paper sheet, so that the tensioning of the paper can be easily and accurately controlled, tearing of perforation holes can be prevented, the operation of the printing apparatus is greatly simplified, as well as to smooth out the starting and stopping of the paper when a user starts and stops the operation of the apparatus.

Also in light of Wassermann's teaching, it would have been obvious to one of ordinary skill in the art to use Wassermann's evacuation device (which variably

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sets the braking force) as a paper brake anywhere in a continuous paper feeding device with a tractor.



Claim 27:

Chinzei in view of Miyakoshi and Nishimura teaches a continuous paper feeding apparatus according to claim 1.

Chinzei in view of Miyakoshi and Nishimura is silent about the braking force setting device sets the braking force based on a user-input submitted to the paper feeding apparatus.

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Wassermann teaches a continuous paper feeding device with an evacuation device 19 to apply a suction force to a continuous paper sheet, wherein the braking force setting device setting the braking force based on a user-input submitted to the paper feeding apparatus. Namely, a user submits an input by adjusting end plates 22 and 23 (Fig. 2, reproduced above), thus a paper width is specified, and the vacuum chamber 19 is automatically adjusted to the corresponding width, and so is the braking force (Col. 2 line 57 – col. 3 line 2).

As discussed in above in claims 6, 13 and 25, it would have been obvious to one of ordinary skill in the art at the time the present invention was made to use Wassermann's evacuation device in Chinzei + Miyakoshi + Nishimura's apparatus. As a result, the braking force setting device would set the braking force based on a user-input submitted to the paper feeding apparatus.

Claim 28:

Chinzei as modified teaches a continuous paper feeding apparatus according to claim 27, wherein the user-input includes an indication of properties (e.g. width) of the continuous paper sheet.

### ***Response to Arguments***

Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to 'Wyn' Q. HA whose telephone number is (571)272-2863. The examiner can normally be reached on Monday - Friday, from 8am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on 571-272-2258. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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NQH

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